

Research Brief

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Understanding College Match Among KIPP Northern California Students

Sometimes students attend a college that is less selective than what their academic achievement in high school would allow, a phenomenon known as undermatch. Nationwide, 50 percent of students from low-income families undermatch, even though attending a more selective college can lead to higher graduation rates and future income (Smith et al. 2013 and Dillon and Smith 2020). Aside from personal reasons, local factors, such as the types of colleges in the area and their affordability, can affect students' choice of where to enroll (Dillon and Smith 2017). For example, in California two large public college systems—the University of California (UC) and California State University (CSU)—shape the postsecondary landscape. However, much of the research on college match to date has been based on national data.

Recognizing the importance of using data to support students' college-going decisions, Tipping Point Community and KIPP Northern California partnered with Mathematica to analyze the college application and enrollment choices of recent high school graduates from the classes of 2016 to 2019. This research brief presents key findings from the study.

What types of colleges do students match to?

Seventy-seven percent of recent KIPP Northern California high school graduates had a high likelihood of being admitted to a four-year college (Table 1). The first step to understanding whether students attend a college that is a good match for them academically is to identify the most selective tier of colleges to which they would likely be admitted given their academic achievement. Based on their GPAs and ACT scores, the greatest share of KIPP Northern California graduates (39 percent) were matched to a selective four-year college such as UC Santa Cruz or UC Merced. These students typically had GPAs between 3.1 and 4.1; on average, they had a 3.6 GPA.

How common is college undermatch?

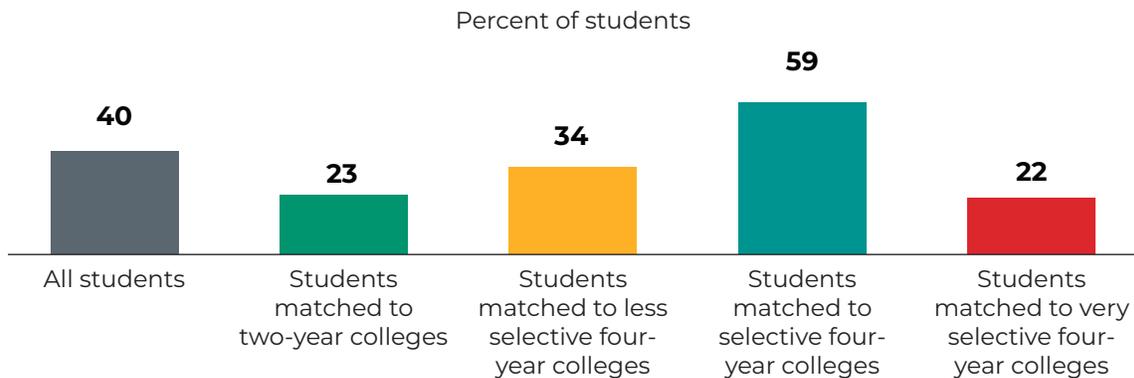
Forty percent of recent KIPP Northern California graduates undermatched, meaning they attended a less selective college than their GPA and ACT scores would make them eligible for (Figure 1). This rate of undermatch is lower than the nationwide rate of 50 percent for low-income students, and lower than the rate in some school districts serving primarily low-income and minority students. For example, in Chicago Public Schools, 62 percent of students undermatched (Roderick et al. 2013). KIPP Northern California high school graduates who likely could have attended a selective four-year college were most likely to enroll in a college that was an undermatch for them given their level of academic achievement (Figure 1).

Table 1. College selectivity tiers KIPP Northern California high school graduates were matched to based on their GPA and ACT scores

College tier	Student GPA		Student ACT score		Students matched	
	Typical range	Average	Typical range	Average	Number	Percent
Two-year college	Less than 2.5	2.2	Less than 21	16	247	23%
Less selective four-year college	2.5 to 3.1	2.8	14 to 23	18	289	27%
Selective four-year college	3.1 to 4.1	3.6	18 to 29	23	430	39%
Very selective four-year college	4.1 or higher	4.3	24 or higher	29	124	11%

Note: The ranges shown reflect the 5th to 95th percentile values.

Figure 1. Prevalence of undermatch among KIPP Northern California high school graduates, by the college tier they were matched to based on their GPA and ACT scores



Black and Latinx students were more likely to undermatch than otherwise similar Asian or White peers. Even after accounting for other student characteristics, including their high school academic achievement, household income, and parents' education level, Black and Latinx students were 8 to 9 percentage points more likely to undermatch than similar students who were Asian or White (see Table A.1 in the appendix). We also found that having a higher Expected Family Contribution (above \$5,000, as determined by the FAFSA), missing more days of school, and not taking Advanced Placement exams were associated with a higher likelihood of undermatching. Among students matched to two-year colleges (those with GPAs below 2.5), being suspended

in high school was associated with a 38-percentage point higher likelihood of undermatching.

About 12 percent of all students did not enroll in college at all or undermatched by more than one tier of college selectivity (Figure 2). Sixteen percent of students matched to two-year colleges did not enroll in any college in the fall after graduating high school. A small share of higher achieving students also did not enroll in any college or enrolled in a two-year college. For example, 12 percent of students matched to selective four-year colleges and 3 percent of students matched to very selective four-year colleges enrolled in a two-year college.

How did Mathematica determine match?

There is no single method for defining match, but the key is determining the most selective tier of college to which students are likely to be admitted based on their academic achievement. Building on past studies, as well as KIPP’s goal that students attend colleges where similar students have thrived, we used the following steps to determine match. For additional details on the data and methods used, see the Appendix.

1. We grouped colleges into the following four tiers, using both selectivity information from the Carnegie Classifications of Institutions of Higher Education (which classify colleges based on the test scores of entering students) and the graduation rates of students from racial and ethnic minority groups.

College tier	Number of colleges in data	Minority student graduation rate (25th to 75th percentiles)	Top 5 most popular colleges among recent KIPP Northern California graduates
Two-year college	171	15 to 28%	Chabot College, City College of San Francisco, Evergreen Valley College, De Anza College, Berkeley City College
Less selective four-year college	550	29 to 47%	San Jose State University, San Francisco State University, CSU East Bay, CSU Sacramento, Sonoma State University
Selective four-year college	311	58 to 72%	UC Santa Cruz, UC Merced, UC Riverside, UC Santa Barbara, CSU Long Beach
Very selective four-year college	105	84 to 91%	UC Davis, UC Irvine, UC San Diego, UC Berkeley, UCLA

2. We predicted students’ likelihood of admission to each tier based on their GPA and ACT score.
3. We determined the highest tier to which each student had a high likelihood of admission (80 percent or higher). This was the tier the student was “matched” to. For determining undermatch, if a student was admitted to a higher tier than we predicted, we updated the highest tier to which the student had access.
 - If the highest tier to which each student had access was more selective than the tier the student enrolled in, that student was considered to have undermatched. ▲

When in the process do students undermatch?

The vast majority of KIPP Northern California graduates applied and were admitted to at least one college that was a match for them academically. While students who undermatch nationwide apply to only two colleges, on average (Dillon and Smith 2017), KIPP Northern California graduates who undermatched consistently applied to a greater number of colleges (Figure 3). Students with higher academic achievement applied to more colleges, particularly in higher selectivity tiers. Overall, 97 percent of students applied to and 94 percent were admitted to at least one match

college or higher (Figure 4). In other words, very few students undermatched at the application stage. In contrast, 66 percent of low-income students nationwide do so at the application stage (Smith et al. 2013). However, KIPP Northern California graduates who went on to undermatch applied to fewer colleges, on average, and tended to target colleges in lower tiers than those who ultimately attended a match college or better.

The primary driver of undermatch was students’ decision in the spring of their senior year about where they would enroll in the fall. Although 94 percent of students were admitted to a match college or higher, only 75 percent indicated in the spring

Figure 2. College tiers KIPP Northern California high school graduates enrolled in, by the tier they were matched to based on their GPA and ACT scores

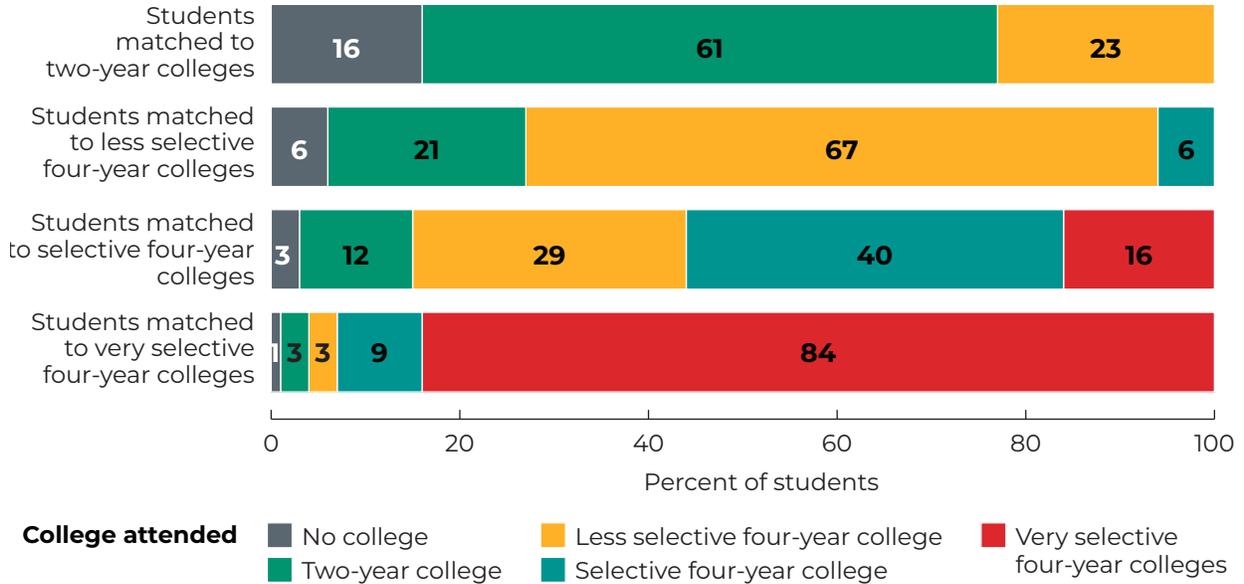


Figure 3. College applications of KIPP Northern California high school graduates, by the tier they were matched to based on their GPA and ACT scores

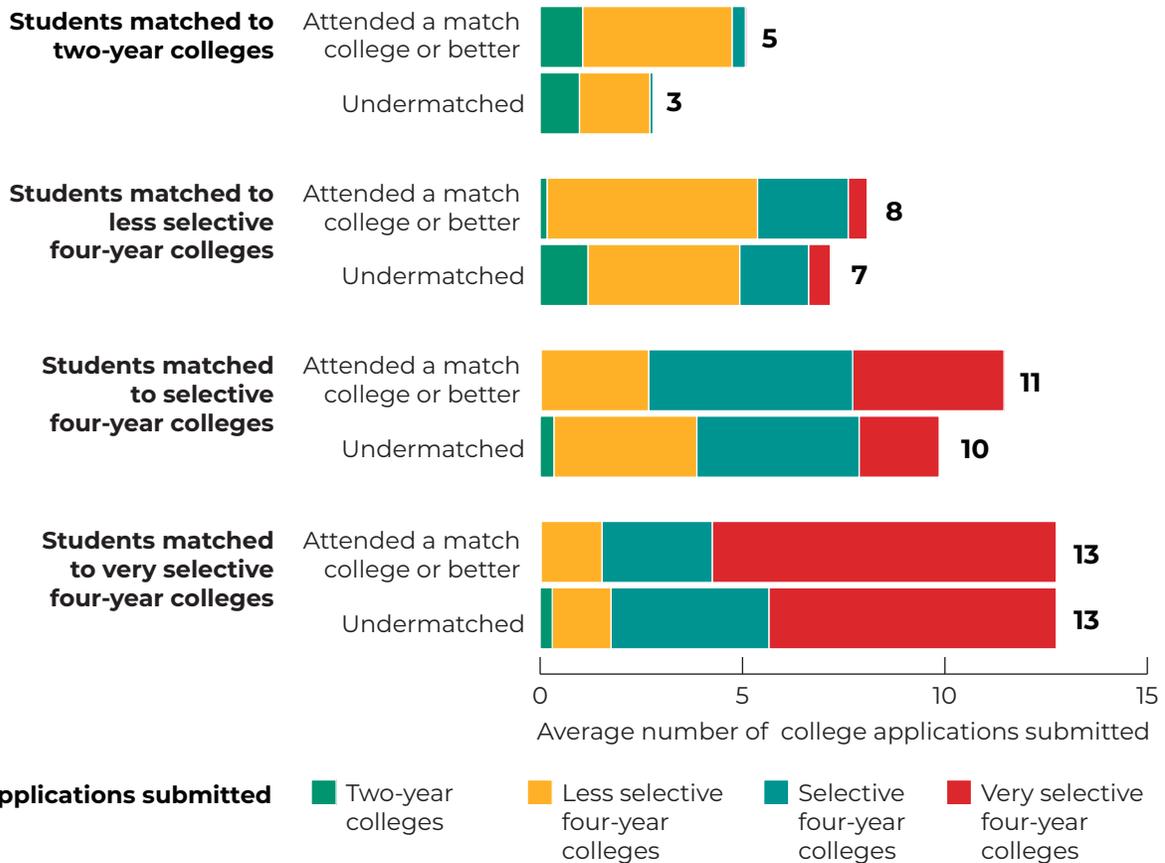
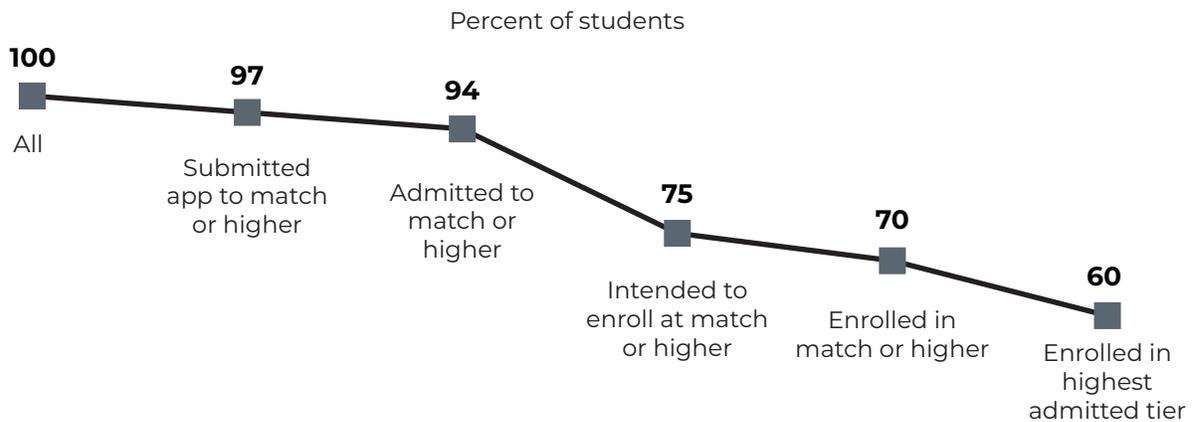


Figure 4. Pipeline to enrolling in a match college for KIPP Northern California high school graduates



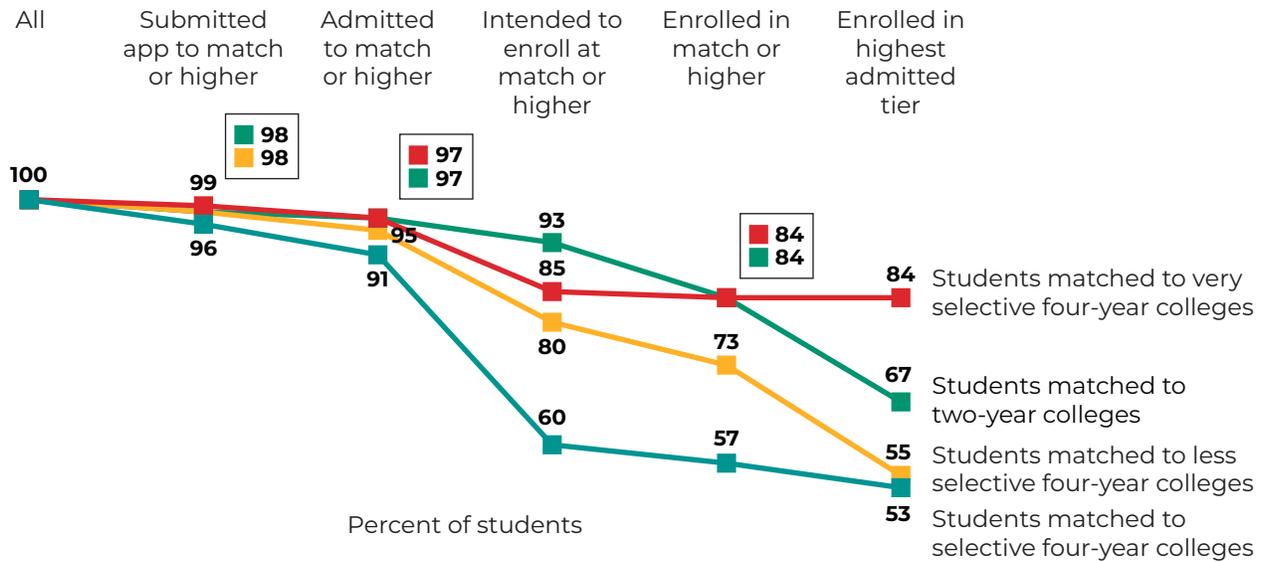
of their senior year that they intended to enroll in a match college or higher (Figure 4). Students eligible to attend a selective four-year college (those with high school GPAs between 3.1 and 4.1) were most likely to choose a college that was an undermatch for them: 91 percent were admitted to a selective or very selective college, but only 60 percent planned to attend a college in these tiers (Figure 5).

Few students changed their college plans over the summer after graduating high school. Whereas 75 percent of students indicated in the spring that they intended to enroll in a match college or higher, 70 percent actually did so in the fall (Figure 4). Over the summer, these students decided to instead attend either a lower tier college or no college at all. Black and Latinx students were twice as likely than their Asian peers to change their plans over the summer. Students matched to two-year colleges (those with high school GPAs below 2.5) were most likely to change their plans over the summer: 93 percent intended to enroll in college but only 84 percent actually enrolled anywhere (Figure 5). Put differently, 10 percent of these students “melted” out of college over the summer. Among low-income students nationally, summer melt—as this phenomenon is known—can be as high as 40 percent (Castleman et al. 2013).

Making a match

Each fall, KIPP Northern California counselors work with high school seniors to create a college “wish list” based on their academic achievement, financial needs, and interests. Students and families are given access to a match tool that provides personalized information about colleges based on students’ GPA and ACT scores. Counselors advise students to select schools that are likely, target, and reach colleges based on their academic achievement and offer guidance on how to request application waivers from colleges. KIPP Northern California also dedicates funds to help high-need students cover the cost of applications. Nevertheless, students cannot always afford to apply to as many colleges as they might like. To help students prioritize, counselors recommend that students submit a minimum number of applications based on their academic achievement. For example, students with an ACT score of 16 or higher and GPA between 2.5 and 3.0 are encouraged to submit at least six applications; those with a 3.0 or higher are encouraged to submit at least nine applications. Counselors track students’ wish lists—and later, their applications, admissions, and enrollment—in a data system, which they use to follow up with students at key points in their senior year. At the end of the academic year, staff analyze the data to measure progress over time in helping students attend not just any college, but one that is a good match.” ▲

Figure 5. Pipeline to enrolling in a match college for KIPP Northern California high school graduates, by the tier students were matched to based on their GPA and ACT scores



Freezing summer melt

Even after students graduate high school, they continue to receive support from KIPP Northern California. Each alum is paired with a counselor who texts, calls, or emails them starting the summer after high school graduation. Counselors have a checklist of tasks students need to complete before being able to start college in the fall and are there to help answer questions. As the number of alumni has grown, technology has also played a role in addressing summer melt. In 2019, KIPP Foundation launched the National Nudge Texting Pilot, which sent recent graduates personalized text messages with reminders about key tasks leading up to college enrollment. "▲

Some students who attended a match college had the option of choosing an even more selective college but did not do so. Some students were admitted to a more selective college than we predicted for them based on their GPA and ACT scores but did not enroll in this higher tier. For example, 84 percent of students matched to two-year colleges attended a match college or better,

but only 67 percent enrolled in the highest tier available to them (Figure 5). In other words, 17 percent of students with GPAs below 2.5 had access to a four-year college but chose a two-year college. Research is mixed on whether students are better off attending a college that is more selective if it is an overmatch for them academically (for example, see Light and Strayer 2000).

How do college characteristics influence undermatch?

Students who undermatched were more likely to attend a lower-cost public college within commuting distance. Whereas 31 percent of students who attended a college that was a match for them based on their GPA and ACT score stayed within commuting distance, 81 percent of students who undermatched stayed close to home. In addition, students who undermatched were five times more likely to attend a public rather than a private college. Latinx students were more likely than their Black and Asian peers to attend a public college close to home. Students who undermatched also attended colleges with a net price (that is, the

price after financial aid and scholarships) that was typically about \$1,500 lower per year. Anecdotally, KIPP Northern California counselors noted that students' financial needs, their desire to stay close to home, and their interests in particular majors and careers were common factors in the decision to attend a college that might be an undermatch. Other research shows that financial constraints and public college options nearby affect undermatch (Dillon and Smith 2017).

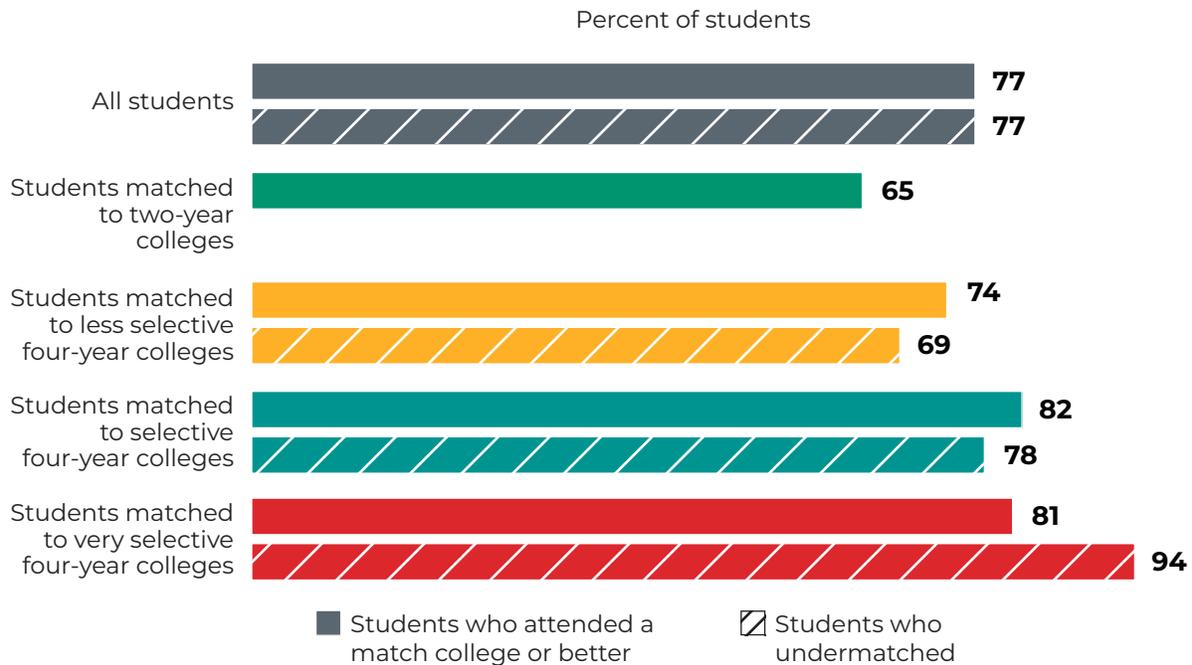
How does college match relate to college success?

Students who undermatched were as likely to persist to a second year of college as students who attended a match college. Overall, 77 percent of students in both groups persisted to a second year of

college (Figure 6). Nationwide, 76 percent of first-time freshmen persist to a second year; this rate is lower for Latinx and Black students nationally, at 72 and 66 percent, respectively (National Student Clearinghouse 2020). Among KIPP Northern California students eligible to attend less selective and selective four-year colleges (those with GPAs between 2.5 and 4.1), students who attended a match college or better were 4 to 5 percentage points more likely to persist to a second year compared to those who undermatched.¹

KIPP Northern California graduates who undermatched attended colleges with lower minority graduation rates than their peers who attended a match college or better. Students who undermatched attended colleges with a median minority graduation rate of 45 percent compared to 69 percent for students who attended a match

Figure 6. College persistence rates, by the tier students were matched to based on their GPA and ACT scores and whether they attended a match college



¹ Among students matched to very selective four-year colleges, students who attended a match college or better had a lower persistence rate than those who undermatched (Figure 6). However, because a relatively small number of these students undermatched (31 in total), just a handful of students could affect this group's persistence rate.

college or better. Currently, not enough time has passed to examine college completion among these cohorts of KIPP Northern California graduates. Research suggests that attending a college that is more selective increases students' likelihood of graduating (Dillon and Smith 2020), although there is some mixed evidence on whether this is true regardless of whether the college is a good academic match for the student. For example, one study found that students' chances of graduating could be lower if they attended a very selective college rather than a selective college that was a better match for them academically (Light and Strayer 2000).

Improving college match among Northern California students

KIPP Northern California high school graduates were less likely to undermatch than other similar students overall, but especially at the application and admissions stages. This may reflect in part the guidance and support counselors provide around college applications. For KIPP Northern California students, the primary driver of undermatch was their decision about where to enroll. There are many reasons why students may not choose to attend the most selective college available to them, including having unmet financial needs or needing to stay close to family. Thus, a college that is a good match academically may not necessarily be the best fit for a student given their circumstances. Nevertheless, there are some opportunities schools and policymakers can consider for supporting low-income students on their journeys to a best-fit college.

KIPP Northern California students with GPAs between 3.1 and 4.1 were especially likely to undermatch and thus might benefit from additional support. High school counselors could focus support on students who have the academic achievement to attend a selective four-year college yet are considering applying to a two-year college, as this was associated with undermatching. Not taking Advanced Placement exams was also correlated with undermatch for these students, suggesting that academic undermatch can occur earlier in students' high school careers. Providing information about potential match colleges, including the graduation rates and net costs for

similar students, can reduce undermatch among low-income students, especially if this information comes from a trusted source (Hoxby and Turner 2013).

Another group of students who might benefit from additional support are those with GPAs below 2.5. In the spring of their senior year, 93 percent of these students had been admitted to college and intended to enroll, yet 16 percent did not enroll anywhere in the fall. Among these students, being suspended in high school was associated with undermatching. Thus, counselors might offer more intensive outreach over the summer to students with low GPAs and past suspension histories. Providing guidance about key tasks students need to complete before the fall semester (such as submitting required forms and registering for classes) and following up with students over the summer can improve their chances of enrolling in college in the fall (Castleman et al. 2013).

In addition, there is ample evidence that financial constraints are an important factor for students' decision of where to enroll and can contribute to undermatch. In a recent survey of California college students, 38 percent said they did not have the resources to afford tuition and fees and 35 percent reported housing insecurity (California Student Aid Commission 2019). Although Black and Latinx students were more likely to receive financial aid, they were also more likely to report housing insecurity and say they did not have enough resources to cover college expenses than their Asian and White peers. California policymakers could consider ways to address these systemic barriers to college access.

As this and other studies show, the extent to which students undermatch can vary significantly across local contexts. Thus, these findings may not apply to other school districts in California or other KIPP regions across the country. However, they underscore the value of gathering data on students' college applications and admissions—in addition to their enrollment—to understand college match in local contexts and identify students who might benefit from additional support in particular stages of the college application and enrollment process.

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Appendix

Below we provide additional details about the data, methods, and results discussed in the brief.

Data

De-identified student data were provided by KIPP Northern California, and included students' graduating cohort, race, gender, and other background characteristics, the high school they attended, their academic achievement (weighted GPA and highest ACT score), the set of college applications they submitted along with the admissions outcome of each application, and their college enrollment history. Students' individual home addresses were not available, so to calculate the distance to colleges we used the straight-line distance between the college and the high school from which the student graduated.

We limited the analysis sample to students who graduated from a KIPP Northern California high school between 2016 and 2019, the last year of data available. Students who attended a KIPP Northern California middle school or high school but graduated elsewhere often had incomplete data and were thus excluded. We also excluded students from cohorts prior to 2016, as GPA data were not consistently available for these cohorts. Finally, we excluded the 4 percent of graduates from 2016 to 2019 who were missing a GPA (1 percent) or ACT score (3 percent).

Data on college characteristics came from the U.S. Department of Education's Integrated Postsecondary Education Data System (IPEDS), and included information on selectivity, incoming students' standardized test scores, graduation rates, and costs of attendance. Because IPEDS only covers U.S. institutions, we obtained the relevant information for a small number of colleges outside of the U.S. from online sources.

Methods

We grouped colleges into four tiers, using both selectivity information from the Carnegie Classifications of Institutions of Higher Education

(which classify colleges based on the test scores of entering students) and the graduation rates of minority students. The first tier is comprised of all two-year colleges. Less selective four-year colleges include four-year colleges labeled "inclusive" in the Carnegie Classifications as well as those labeled "selective" but with a minority graduation rate less than 55 percent. Selective four-year colleges include those classified as "selective" with a minority graduation rate over 55 percent and those classified as "more selective" but with a minority graduation rate under 80 percent. Finally, very selective four-year colleges included those classified as "more selective" and with a minority graduation rate over 80 percent. In creating these tiers and selecting the minority graduation rate cutoffs, our goal was to create meaningful categories that had a sufficient number of colleges in each for analysis.

To determine the probability of admission for each student to each tier, we began by estimating the likelihood of ever being admitted to a college in that tier among students who applied to any colleges in that tier. We used a logistic regression model that included the student's GPA, ACT, and number of applications to colleges in that tier as the predictors. This approach is similar to the one used by Smith et al. (2013). However, we differ somewhat in that we attempt to control for the number of applications a student submits. Although some of the relationship between number of applications submitted and likelihood of admission may be due to selection (that is, students with higher ability applying to more, and more selective, colleges), this should also capture the idiosyncrasies of the application process and the fact that submitting more applications necessarily increases the chance of having at least one successful application.

Using the results of these models, we then estimated each student's probability of admission to each tier assuming they made four applications to colleges in that tier, which is generally consistent with the application guidance provided by KIPP counselors. We do this to make our measure of match agnostic to students' actual college application choices—for example, a student could

have a high probability of being admitted to a tier but not chosen to apply. Once we have an estimate of a student's probability of admission to each tier of colleges, we assign them to a matched tier based on the highest tier where they had at least an 80 percent estimated probability of admission. We then consider them to undermatch if they do not attend a college of at least that tier.

The advantage of this method is that we can identify students who never apply to colleges that would be a good academic match for them or who do not apply to enough match colleges to have a high enough chance of being admitted into one. We can also use our definition earlier in the pipeline (for example, to identify students who do not apply to a match college). However, a probability-of-admissions model necessarily has false negatives. For example, if a student has a 75 percent probability of being admitted to a four-year college, we would match them to the two-year college tier. Yet we fully expect some students with less than an 80 percent probability

of admission to in fact be admitted to a four-year college. Thus, in measuring overall match rates we updated the highest tier accessible to students if they were admitted to a higher tier than we predicted.

Additional results

In addition to the summary statistics presented in the brief, we conducted a regression analysis to identify student characteristics associated with undermatch among all students, as well as separately for the subsets of students matched to each college tier. Table A. 1 presents the results of a series of linear probability models that include school fixed effects. The values indicate the estimated change in the probability of undermatching given a one-unit increase in each covariate, holding all others constant. For example, male students matched to less selective four-year colleges had a 13.1 percentage point higher probability of undermatching than otherwise similar female students.

Table A1. Student characteristics associated with undermatching

Student characteristic	All students	Students matched to two-year colleges	Students matched to less selective four-year colleges	Students matched to selective four-year colleges	Students matched to very selective four-year colleges
Male	0.033	0.078	0.131*	-0.020	0.088
Black	0.087	-0.045	0.086	0.158	0.040
Latinx	0.089	0.067	0.148	0.030	0.201
Asian	0.008	-0.043	0.026	-0.018	0.145
English language learner	-0.005	-0.135	-0.018	0.074	0.007
Eligible for free/reduced price lunch	-0.045	0.082	0.006	-0.091	-0.131*
No parent college	-0.005	0.119	-0.038	-0.008	0.048
\$0 Expected Family Contribution	-0.016	0.130	-0.133	0.047	-0.010
\$1-5,000 Expected Family Contribution	-0.113*	0.162	-0.243*	-0.072	-0.132
No FAFSA data	0.030	0.158	-0.010	0.021	0.104
High school attendance rate	-1.433*	1.299	-2.120	-1.765	-2.973
No attendance data	-0.284	-0.345	-0.447	0.000	0.219
Ever suspended in high school	0.086	0.379*	-0.054	0.011	-0.104
Number of suspensions	-0.058	-0.075	-0.003	-0.048	-0.087
Number of Advanced Placement exams taken	-0.034*	-0.023	-0.030	-0.082*	-0.066*
Number of Advanced Placement exams passed	-0.032*	0.016	0.017	-0.043*	0.001
Matched to a two-year college	-0.252*	—	—	—	—
Matched to a less selective four-year college	-0.069	—	—	—	—
Matched to a selective four-year college	0.077	—	—	—	—
Number of students	1,049	141	292	401	215

* Statistically significant at the 10 percent level.